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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/511,934	02/24/2000	Hideaki Fukuda	ASMJP.032AUS	5598

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EXAMINER

KACKAR, RAM N

ART UNIT	PAPER NUMBER
1763	15

DATE MAILED: 04/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

### Application No.

09/511,934

### Applicant(s)

FUKUDA ET AL.

### Examiner

Ram N Kackar

### Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

1) Responsive to communication(s) filed on 25 March 2003.

2a) This action is **FINAL**.      2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

4) Claim(s) 1, 4-7, 9 –10 and 21 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) \_\_\_\_\_ is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) All b) Some \* c) None of:  
1. Certified copies of the priority documents have been received.  
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

1) Notice of References Cited (PTO-892)      4) Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.  
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)      5) Notice of Informal Patent Application (PTO-152)  
3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.      6) Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-7, 9-10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel et al (US Patent 6019848) in view of Kao et al (US Patent 6125859).

Frankel discloses a susceptor with a heater (Fig 11) provided in a reaction chamber (Fig 1A- 200), conveyer for loading and unloading the wafers in to the reaction chamber (Col 25 line 1-3), cleaning device comprising a controller of gas (Fig 1D 153 and 163), vacuum controller (Fig 1D-165), a cleaning gas activator (Col 54 line 39 or Fig 1A 55), a program which instructs the controller to take the substrate out of the reaction chamber after processing and proceed with the chamber clean using activated cleaning gas ( Fig 1D –157a and Col 54 line 8-29), evacuate the chamber after cleaning (Col 56 line 10-22), typical range of 500-800 C for deposition temperature (Col 53 line 38-41), cleaning gas being Fluorine (Col 9 line 13-15) and Fluorine radicals (Col 54 line 34), a plasma discharge region (Col 54 line 39), a remotely located plasma discharge chamber (Fig 1A -55), unwanted deposits like silicon oxide (Col 9 line 24-26), a plasma CVD apparatus(Col 2 line 31-34) and a shower head above the susceptor in the reaction chamber (Fig 5- 20).

Frankel et al do not expressly disclose the step of inert gas flow and reduction of susceptor temperature prior to start of the cleaning gas activation.

Kao et al disclose introduction of inert gas prior to introduction of reactive cleaning gas (Abstract) and both Frankel and Kao disclose flow of inert gas prior to any reactive gas (cleaning gas is a reactive gas) for pressure stabilization (Frankel – Col 18 lines 65-68 and Kao-Col 11 lines 53-60) and disclose a preferred temperature range of pedestal during the cleaning process to be 400°-700° C (Kao- Col 17-lines 59-63 and Frankel- Col 54 lines 67 to Col 55 line 1). Since inert gas does not react, its introduction prior to or simultaneously with temperature reduction is immaterial.

Therefore it would have been obvious to one having ordinary skill in the art at the time invention was made, to add the step of inert gas introduction for pressure stabilization and removal of particulates before introduction of reactive cleaning gas and simultaneously with temperature reduction of the susceptor to bring it to recommended range (400-700) as per the teaching of Kao et al.

*Response to Amendment*

Applicants arguments filed on 03/25/2003 are considered but not found to be persuasive.

Applicant has argued that the range of temperature “ about 470 ° C or lower “ is critical and achieves unexpected results and has filed a declaration under rule 1.132 to support this claim.

Applicant conducted two sets of experiments. In first set of three cleaning experiments at 600° C, 500° C and 470° C found particles on the showerhead at 600° C and 500° C and no particles at 470° C.

In the second set of experiments, deposition was conducted at 600° C after cleaning at 500° C and thickness and stress were measured for each substrate after deposition. After 525

substrates, reduction in thickness was observed and film stress increased as more and more substrates were processed. When the cleaning was done at 470° C and deposition conducted at an unspecified temperature, film thickness and film stress did not change even after many substrates.

It is not clear if during these experiments all other factors affecting cleaning were held constant. For example, the temperature of other surfaces may influence unwanted deposition on them. Kao discloses (Col 17 lines 37-42) that cleaning parameters may vary widely while still providing acceptable cleaning of processing chamber, but certain ranges provide particularly efficient and complete cleaning of the chambers interior surfaces.

In view of the above it appears that the temperature 470° C is neither critical nor unique and the applicant/Declarant have not been able to establish the criticality of the claimed range.

Applicants other arguments have been addressed before.

### *Conclusion*

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 703 305 3996. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703 308 1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9310 for regular communications and 703 872 9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0661.

RK  
April 22, 2003



SHREVE P. BECK  
SUPERVISORY PATENT EXAMINER  
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